599.745:2
599.745.2
Pam: 599.745.2 MAN c.1

FISHERIES RESEARCH BOARD OF CANADA

ARCTIC UNIT
Montreal, Que.

CIRCULAR NO. 2

THE WALRUS IN THE CANADIAN ARCTIC

LIBRARY
BOREAL INSTITUTE
SEP 6 1960

by

A. W. MANSFIELD

January, 1959

POLAR
PAM
3783
POLARPAM

FISHERIES RESEARCH BOARD OF CANADA

ARCTIC UNIT
Montreal, Que.

CIRCULAR NO.2

THE WALRUS IN THE CANADIAN ARCTIC

by

A.W. MANSFIELD

05237

January, 1959

FISHERIES RESEARCH BOARD
OF CANADA

ARCTIC UNIT
Montreal, Que.

CIRCULAR NO. 2

THE WALRUS IN THE CANADIAN ARCTIC

by

A.W. MANSFIELD

1958

January, 1959

INTRODUCTION

This circular has been written primarily for the interest of those residents in the Canadian arctic who are concerned with the welfare of the Eskimo people. Much of the information concerning the natural history of the walrus is widely known already, but some of the more recent work on growth, age and reproduction (Mansfield, 1958) will be unfamiliar to most readers. It is hoped that this brief review of walrus biology will help in emphasising the need for careful conservation of this most valuable natural resource.

GENERAL REMARKS

The walrus Odobenus rosmarus is a northern circumpolar species which rarely strays further south than the average spring limit of the pack ice. The distribution of land and sea ice, both in prehistoric and recent times, has resulted in the formation of three or more geographically isolated groups. These inhabit: (a) the east Greenland coast, Spitzbergen, Franz Josef Land and the Barents and Kara Seas; (b) the Bering and Chukchee Seas; and (c) the eastern Canadian arctic and western Greenland. There is also the possibility that the herds frequenting the Laptev Sea, north of Siberia, form a fourth distinct group. Lone animals from the Bering and Chukchee Sea herds may occasionally stray to the Canadian arctic coast eastwards from Herschel Island to Banks and Victoria Islands, but these are comparatively rare and are of little importance to the native economy.

In recent historic times, walrus were abundant and widespread, and breeding herds were recorded as far south as Sable Island off the coast of Nova Scotia, and at the Magdalen Islands in the Gulf of St. Lawrence. The depredations of the early seafarers had exterminated the walrus at these two places by the end of the eighteenth century, and then the pursuit extended into more northerly waters. During each short summer season, Davis Strait, Hudson Strait and Hudson Bay were invaded by ships seeking easy returns of oil and baleen. The large Greenland whale or Bowhead Balaena mysticetus was nearly exterminated, and then the whalers turned their attention to the less profitable but easily obtainable walrus, and the smaller cetaceans such as the narwhal Monodon monoceros and the white whale Delphinapteras leucas.

With the introduction of the rifle into the Eskimo economy and the increased demands for ivory and skins, the walrus herds suffered a serious decline in most areas. Only the resident and comparatively inaccessible populations of Foxe Basin and the northernmost part of Baffin Bay were saved from over-utilisation.

In 1931 a Department of Fisheries Act was passed which prohibited the export of unworked ivory and skins from the arctic, and limited the taking of walrus to Eskimo families and certain white residents. This Act was amended in 1949 by a set of more explicit regulations, which are set out in full in Appendix II. In practice, these regulations appear to have prevented over-utilisation in most areas, though bad hunting techniques in a few localities may have offset the advantages gained.

PRESENT DISTRIBUTION AND POPULATION STATUS

The range of the species in the eastern Canadian arctic is shown in Figure 1. This is based on definite records in the literature and on observations by members of the R.C.M.P., the Canadian Wildlife Service and the Fisheries Research Board of Canada.

Along the east coast of Hudson Bay and in most of Ungava Bay, there are definite gaps in the distribution, but in other areas such as eastern Foxe Basin and northeastern Baffin Island the distribution is uncertain. More observations are needed from these relatively inaccessible areas, and the Arctic Unit would be pleased to receive any reports which can extend our knowledge of the range of the walrus and any other species of marine mammals.

There is little information about the status of the population as a whole. On present results, the northern Hudson Bay stock about Southampton and Coats Islands is estimated at 3,000 animals (see Dunbar, 1956 and Loughrey, 1955). The average annual kill in this area is approximately 200 walrus, and this is probably close to full utilisation.

In Foxe Basin the reproductive potential seems to be much greater, in spite of an average annual kill of 400, and the herds there are probably in no danger of depletion at the present level of hunting. There is little utilisation of the Canadian stocks in northern Baffin Bay, Lancaster and Jones Sounds, and Davis Strait, and the annual kill could

With the introduction of the rifle into the Eskimo economy and the increased demands for ivory and skins, the walrus herds suffered a serious decline in most areas. Only the resident and comparatively inaccessible populations of Foxe Basin and the northernmost part of Baffin Bay were saved from over-utilization.

In 1931 a Department of Fisheries Act was passed which prohibited the export of unworked ivory and skins from the Arctic, and limited the taking of walrus to Eskimo families and certain white residents. This Act was amended in 1949 by a set of more explicit regulations, which are set out in full in Appendix II. In practice, these regulations appear to have prevented over-utilization in most areas, though bad hunting techniques in a few localities may have offset the advantages gained.

PRESENT DISTRIBUTION AND POPULATION STATUS

The range of the species in the eastern Canadian Arctic is shown in Figure I. This is based on definite records in the literature and on observations by members of the R.C.M.P., the Canadian Wildlife Service and the Fisheries Research Board of Canada.

Along the east coast of Hudson Bay and in most of Ungava Bay, there are definite gaps in the distribution, but in other areas such as eastern Foxe Basin and northeastern Baffin Island the distribution is uncertain. More observations are needed from these relatively inaccessible areas, and the Arctic Unit would be pleased to receive any reports which can extend our knowledge of the range of the walrus and any other species of marine mammals.

There is little information about the status of the population as a whole. On present results, the northern Hudson Bay stock about Southampton and Coats Islands is estimated at 3,000 animals (see Dunbar, 1956 and Loughrey, 1955). The average annual kill in this area is approximately 200 walrus, and this is probably close to full utilization.

In Foxe Basin the reproductive potential seems to be much greater, in spite of an average annual kill of 400, and the herds there are probably in no danger of depletion at the present level of hunting. There is little utilization of the Canadian stocks in northern Baffin Bay, Lancaster and Jones Sounds, and Davis Strait, and the annual kill could

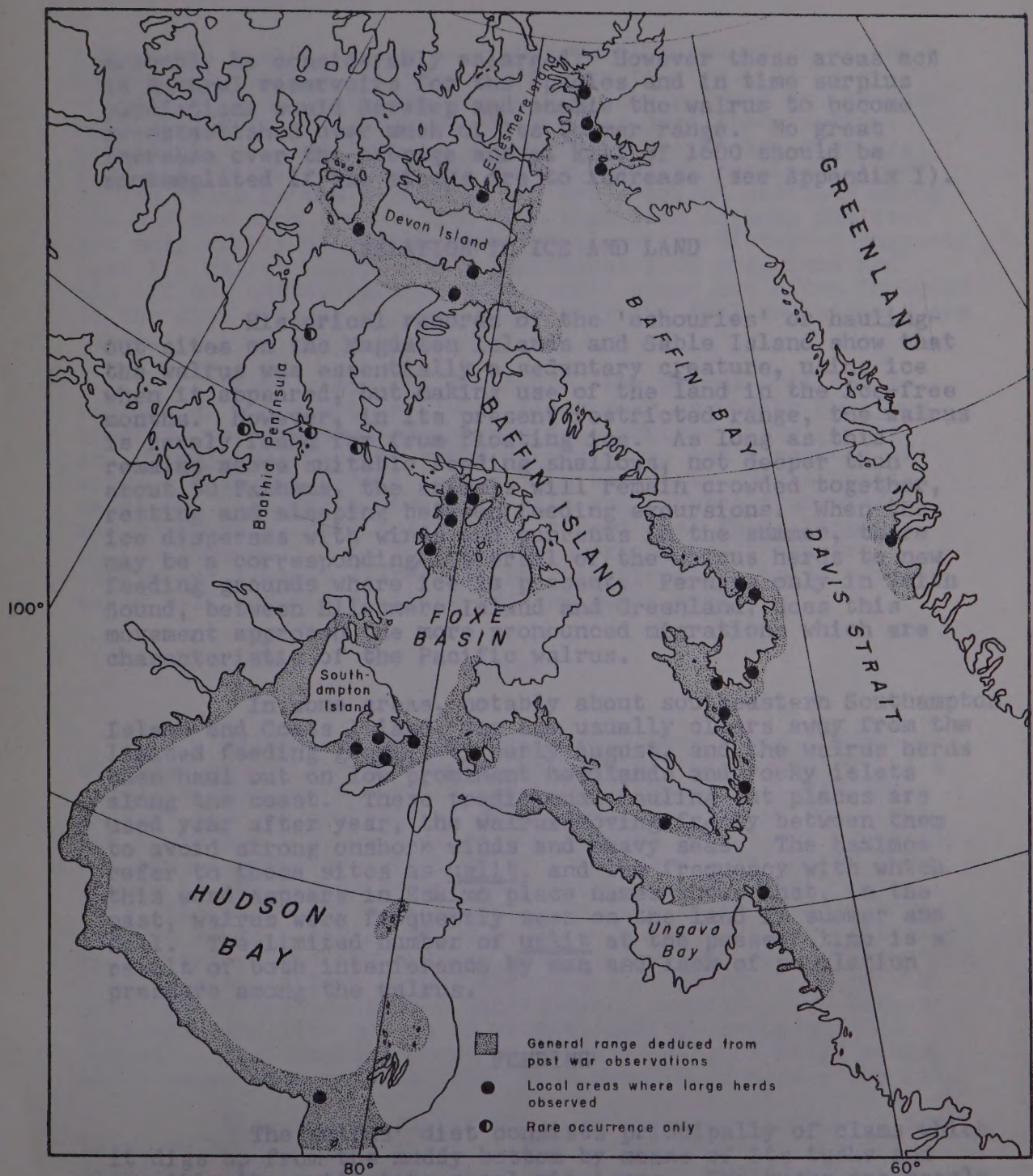


Fig. 1. Distribution of the walrus in the eastern Canadian arctic.

Fig. 1. Distribution of the walrus in the eastern Canadian arctic.

probably be considerably enlarged. However these areas act as natural reservoirs for the species and in time surplus populations would develop and enable the walrus to become re-established over much of its former range. No great increase over the average annual kill of 1600 should be contemplated if the stocks are to increase (see Appendix I).

RELATION TO ICE AND LAND

Historical records of the 'echouries' or hauling-out sites on the Magdalen Islands and Sable Island show that the walrus was essentially a sedentary creature, using ice when it appeared, but making use of the land in the ice-free months. However, in its present restricted range, the walrus is rarely found far from floating ice. As long as this remains above suitable feeding shallows, not deeper than about 50 fathoms, the animals will remain crowded together, resting and sleeping between feeding excursions. When the ice disperses with winds and currents in the summer, there may be a corresponding dispersal of the walrus herds to new feeding grounds where ice is present. Perhaps only in Smith Sound, between Ellesmere Island and Greenland, does this movement approach the more pronounced migrations which are characteristic of the Pacific walrus.

In some areas, notably about southeastern Southampton Island and Coats Island, the ice usually clears away from the limited feeding grounds by early August, and the walrus herds then haul out on low prominent headlands and rocky islets along the coast. These traditional hauling-out places are used year after year, the walrus moving freely between them to avoid strong onshore winds and heavy seas. The Eskimos refer to these sites as uglit, and the frequency with which this word appears in Eskimo place names shows that, in the past, walrus were frequently seen on the land in summer and fall. The limited number of uglit at the present time is a result of both interference by man and lack of population pressure among the walrus.

FEEDING

The walrus' diet consists principally of clams which it digs up from the muddy bottom by means of its tusks and possibly the quill-like nasal vibrissae. The tusks are nearly always heavily worn on the front and sides, suggesting that

the animal stands on its head when feeding and stirs up the bottom by rotating its tusks from side to side. It is a surprising fact that clam shells are rarely found in the stomach contents, even when the animal has just been feeding. Generally only the siphons (breathing tubes) of the clam Mya truncata (Figure 2), and the feet of Cardium species (Figure 3) are found in the stomachs, and are a prized delicacy among the Eskimos when fresh. The fact that both siphons and feet are only slowly retracted when the clams are disturbed suggests that the walrus can pick out individual food organisms and nip off the edible parts. Other small clams are often included in the diet (Figure 4), but again only the feet and siphons are taken.

Where clams are not found, the walrus will eat a variety of other bottom living forms such as whelks Buccinum species, sea cucumbers Holothuroidea, shrimps Hippolytidae and Crangonidae, hermit crabs Eupaguridae, and a variety of worms. Fish are rarely included in the diet. Occasionally males are taken with pieces of skin and blubber from other marine mammals, particularly the ringed seal Phoca hispida, in the stomach. This food may be carrion, but there are sufficient factual statements in the literature to show that males will sometimes attack and eat small seals.

GROWTH

The newly born calf may weigh as much as 130 pounds and measure 48 inches from tip of nose to tail (measured in a straight line and excluding the hind flippers), though the average size is probably slightly smaller. During the first two years of life, both males and females grow equally quickly, reaching an average length of 80 inches and a weight of 750 pounds by the beginning of their third year of life. After this, the males and females begin to diverge in average size. Thus in adult females, the maximum average body length attained is 102 inches and the average weight, less blood, approximately 1250 pounds (maximum weight recorded 1600 pounds), while the males reach a considerably larger size, averaging 120 inches in length and 1650 pounds in weight (maximum recorded 2800 pounds). The female appears to cease growing after 15 years, while males grow very slightly even when 20 or more years old.

There is a similar but less divergent growth of the tusks in both sexes. At birth the permanent teeth are not apparent, and it is only after two or three months that the tips of the tusks pierce the gums. Initially the average increase in external tusk length is about one inch per year in both sexes. In males growth in external tusk length slows down

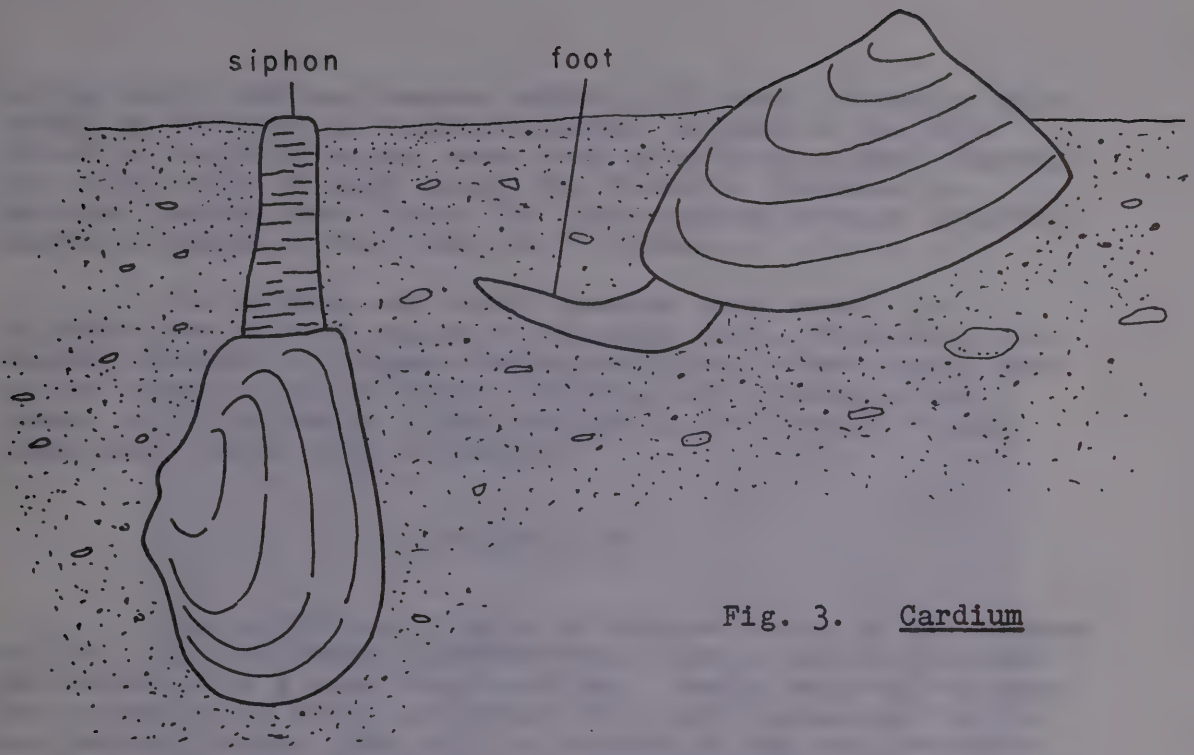


Fig. 3. Cardium

Fig.2. Mya

Fig. 4. Fragments of food organisms taken from walrus stomachs.

Upper row - siphons of Mya.
Centre row - siphons of Saxicava.
Lower row - feet of Cardium.

during adult life and ceases entirely at about 25 years, when growth at the root is counterbalanced by wear at the tip. Indeed in very old males, when tusk growth has almost ceased, the annual rate of wear causes the tusks to decrease in external length (see Figure 5). The maximum average external length attained by the tusks is 14 inches.

In immature and adult females tusk growth is slightly less than in males of the same ages. Generally the smaller diameter of female tusks results in a more rapid wear on the front and sides during feeding, and breakages are common in old animals. This results in few females having tusks much longer than 10 inches.

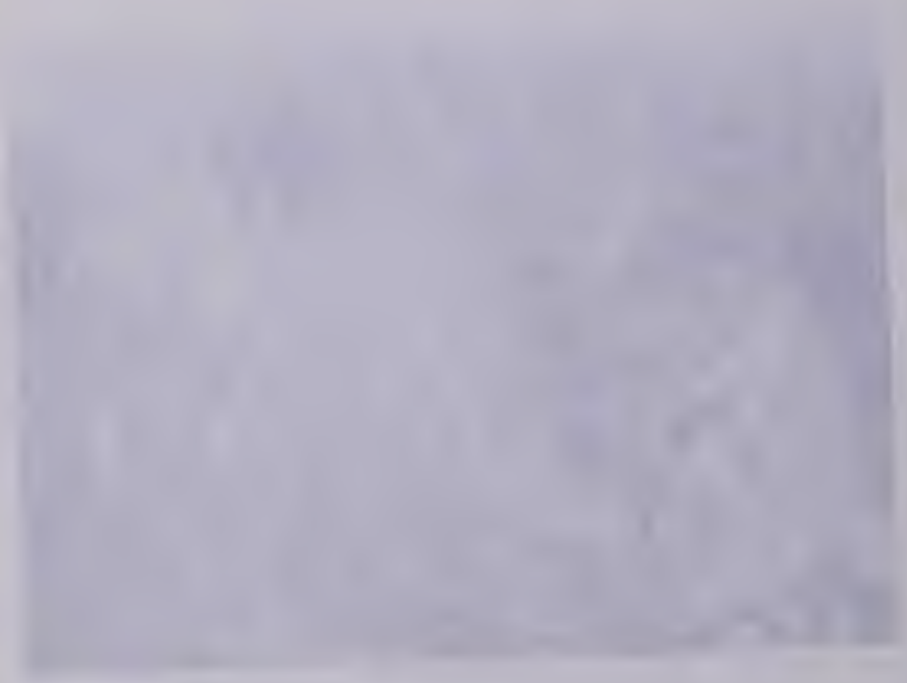
REPRODUCTION

The variation in size of embryos taken in the summer and fall indicates that birth extends over a period of about two months with a peak about mid May. Newly born calves have been observed as early as January but such unseasonal births are probably rare. The calf is suckled by the cow for about two years and only appears to begin independent feeding in its third summer. The cow assiduously protects the calf during the critical period before weaning, and the young animal is able to learn both swimming and feeding techniques while remaining in close contact with her. The particular behaviour pattern in which the calf clings to its mother is very striking and has been commented on by most observers of the walrus in its natural state. Evidently these strong ties between mother and young have great survival value, for the reproductive potential of the walrus is low.

Males mature when six years old and appear to be sexually active throughout the rest of life. Examination of the testes shows that there is a pronounced season of rut extending from late November until late May. Females may be ready to breed when five years old, though the evidence indicates a wide spread in ages at first conception, with a possible peak at seven years.

Mating generally occurs in April and May, and the embryo develops for just over a year. Copulation on the ice has been observed by Eskimo hunters, and there seems little reason to doubt that it also commonly occurs in the water. The walrus appears to be promiscuous in breeding habits and there is no evidence that the adult male maintains a harem of cows in the breeding season, as is found in the polygamous fur seal Callorhinus ursinus of the Pribilof Islands.

Fig. 5. Head of an old adult male showing worn tusks and nasal vibrissae.



Detailed examination of female reproductive tracts shows that the reproductive cycle is basically biennial. Thus after the calf is born, the cow does not mate again until at least the following breeding season. Then at the time when the first calf is just two years old, a new one may be born. This basic pattern is often disrupted by missed pregnancies however, for older females appear to produce a calf only once in three years.

HUNTING AND MORTALITY

The calculated average birth rate is 0.35 calves per adult female per year, which represents an annual increment of about 8 per cent of the total population in any area. This is low when compared with the annual production of young in other species of pinnipeds (approximately 17 per cent in the ringed seal; see McLaren 1958), but is offset by maternal solicitude for the calf and a low natural mortality.

Some measure of natural conservation is effected by the segregation of the sexes which occurs at most times of the year, the adult males remaining apart from the females and young together with immatures of both sexes. Because of the greater rewards of meat, blubber and ivory which are obtained from the larger males, Eskimo hunters will rarely kill females and young if males are also present in the vicinity. Clearly it would be desirable if females and calves were never killed, but any legislation restricting killing to older males would involve frequent hardships to Eskimo hunters and their dependents.

As a first practical measure towards conservation, a booklet designed specifically for Eskimo hunters is in preparation and will be widely distributed in the eastern arctic. It stresses the importance of better hunting techniques in order to reduce losses by sinking, which are evidently high in some areas of depressed native economy in the north. Thus Loughrey (1955) estimates that in addition to the total average annual kill of 1200 walrus for the eastern Canadian arctic (see Appendix I), another 400 are lost by sinking. Clearly it is of great importance that this loss should be substantially reduced, and white residents in the north could help by offering judicious praise to Eskimos whose hunting methods and equipment are of high standard, and by making critical comment where the standard is low.

To appreciate fully the effect of hunting mortality on walrus stocks, we need more returns from the areas where walrus are fully exploited. The methods used in securing these returns are set out in the booklet. Thus in order to examine the age composition of the annual catch of walrus in each area, samples of lower jaws are needed. By examining the regular layers in the cementum (outer bony crust) of molariform teeth, the ages of individual animals may be deduced. It should be stressed that large samples of jaw bones are needed for a good assessment of the total annual catch and its effect on the population.

Circular letters offering a standard reward for samples collected have been distributed to all trading posts and police establishments in the eastern arctic, and reimbursement for specimens received will be made through this office.[1]

REFERENCES

Dunbar, M. J. 1956. The Calanus expeditions in the Canadian arctic, 1947 to 1955. Arctic, 9(3): 178-190.

Loughrey, A. G. 1955. Preliminary investigation of the Atlantic walrus Odobenus rosmarus rosmarus (Linnaeus). Dept. N. Affairs and National Resources, Canadian Wildlife Service, Ottawa, MS, 175 pp.

Mansfield, A. W. 1958. The biology of the Atlantic walrus Odobenus rosmarus rosmarus (Linnaeus) in the eastern Canadian arctic. Fish. Res. Board Canada, MS Rep. Series (Biological), 653, 146 pp.

McLaren, I. A. 1958. The economics of seals in the eastern Canadian arctic. Fish. Res. Board Canada, Arctic Unit, Circular No. 1, 94 pp.

[1] Full address: Fisheries Research Board of Canada,
Arctic Unit,
505 Pine Avenue West,
Montreal 18, Que.

, M. J. 1956. The Eocene sympathies in the Canadian

, A. O. 1957. Preliminary investigation of the
Adlerian weird [eds. We Promised Lysenko (Unknown).

Odobenus rosmarus rosmarus (Unknown) in the western
Canadian Arctic. Fish. Res. Board Canada, Ms Rep.

1958. The occurrence of seals in the eastern
, Circular No. 1, 74 pp.

APPENDIX I

Average annual kill of walrus in the eastern Canadian arctic

Hunting area	Average annual kill
Ungava Bay	40
East coast Hudson Bay	60
Hudson Strait	220
West coast Hudson Bay	50
Southampton Island	200
Foxe Basin	400
Eastern Baffin Island	110
Northern Baffin Island	20
Arctic Islands	100
	1200
Estimated annual loss	400
	1600

These figures are derived from R.C.M.P. game reports and questionnaires circulated by the Canadian Wildlife Service to Post Managers of the Hudson's Bay Company and priests of the Anglican and Roman Catholic Missions (see Loughrey, 1955). The author has much pleasure in acknowledging these sources of information.

The figures are approximate only and may vary widely from year to year depending on ice and weather conditions.

TABLE 1

Breeding area	Average annual kill
[illegible]	[illegible]
East coast Hudson Bay	[illegible]
Hudson Strait	[illegible]
West coast Hudson Bay	[illegible]
Southampton Island	[illegible]
[illegible]	[illegible]
[illegible] Baffin Island	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
Estimated annual loss	[illegible]

[illegible] returns are derived from P.I.W.P. [illegible]
[illegible] and procedures described by Dow [illegible] Wetmore
[illegible] to Fish Managers of the Provincial Game Departments
[illegible]s of the American and Bonn Convention Treaties (see
[illegible] 1957). The author has been pleased to acknowledge
[illegible]es of information.

APPENDIX II

Regulations for the protection of walruses

1. These regulations may be cited as the "Walrus Protection Regulations".

2. In these regulations "Eskimo" includes a person of Eskimo blood who leads the life of an Eskimo.

3. (1) No person shall kill a walrus except for food for himself or his family or his dogs.

   (2) No Eskimo having dependants shall kill more than seven walruses in a year.

   (3) No person other than an Eskimo having dependants shall kill more than four walruses in a year.

4. No person other than an Eskimo shall kill a walrus without a licence issued by authority of the Minister of Fisheries; and not more than two licences may be issued to representatives of any company, organisation or establishment at any one point, station, or post.

5. (1) Unless the hunting or killing is under the supervision of a member or a person authorized by a member of the Royal Canadian Mounted Police, no person shall hunt or kill walruses at Salisbury Island, Nottingham Island or Walrus Island.

   (2) The person supervising the hunting and killing of walruses at any of these islands may limit the number of guns carried by the hunters and the number of walruses which may be taken.

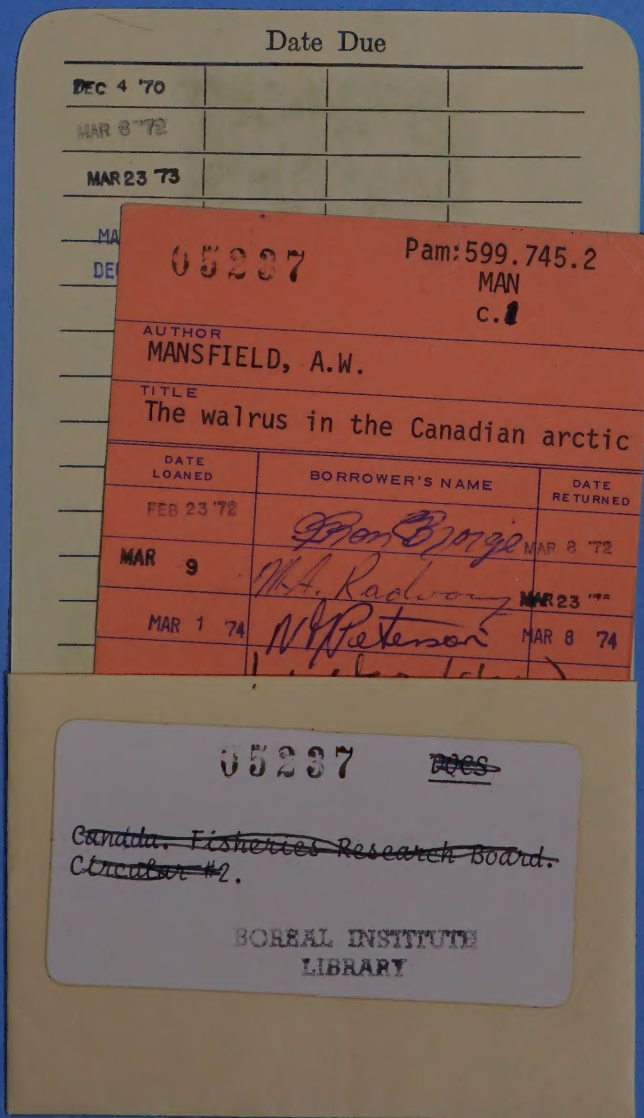
   (3) Not more than one supervised walrus hunt shall take place at any of such islands in a year.

6. Any person killing any walruses shall report each year to an officer of the Royal Canadian Mounted Police on the 31st of December thereof, or as soon thereafter as possible, the number of walruses killed by him and where such walruses were killed.

7. No person shall sell nor otherwise dispose of walrus meat to anyone except to a traveller or other resident for food for themselves or their families or their dogs.

APPENDIX II (cont'd)

8. No person shall ship or export from the Northwest Territories or from those parts of the provinces of Quebec and Newfoundland north of 55° North latitude, walrus tusks that are not carved or otherwise worked up for sale in a retail way nor any walrus hides except under permit issued by authority of the Minister of Fisheries.



Date Due

DEC 4 '70
MAR 8 '72
MAR 23 '73

05237 Pam:599.745.2 MAN c.1

AUTHOR
MANSFIELD, A.W.

TITLE
The walrus in the Canadian arctic

DATE LOANED	BORROWER'S NAME	DATE RETURNED
FEB 23 '72	Brian Bjorge	MAR 8 '72
MAR 9	W.A. Radvan	MAR 23 '72
MAR 1 '74	N.V. Peterson	MAR 8 '74

05237 ~~DOES~~

~~Canada. Fisheries Research Board.~~
~~Circular #2.~~

BOREAL INSTITUTE
LIBRARY

University of Alberta Library
0 1620 0335 2877

IMPRIMEUR DE LA REINE ET CONTROLEUR DE LA PAPETERIE
OTTAWA.